To Study the Pattern of Histopathological Findings in Cases of Medicolegal Autopsies

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ABSTRACT

BACKGROUND

Medicolegal autopsy is an important procedure to ascertain the causes of sudden and unexplained deaths. It provides direct access to organ and tissues which otherwise is not possible with other diagnostic modalities. In addition to the morphological examination of tissues and organs we can also take representative samples from these tissues and organs. These samples may be subjected to histopathological examination and biochemical examination. These types of examinations prove quite helpful in cases of poisoning and sudden unexplained deaths where simple morphological examination may be inconclusive. It provides us an opportunity to study the natural course of evolution of many diseases. Incidental histopathological findings in autopsy also prove useful to account for many clinically undiagnosed diseases in the community like clinically undiagnosed neoplasms, infections and inflammatory diseases. We wanted to study the pattern of histopathological findings in medicolegal autopsy specimens and also age and sex distribution of cases of medicolegal autopsies.

METHODS

This prospective and descriptive study was conducted on three hundred and twenty specimens received randomly from one hundred and four cases of medicolegal autopsies irrespective of cause of death in Department of Pathology, Government medical college, Jammu. The specimens were processed and then stained with haematoxylin and eosin stain.

RESULTS

Maximum patients were seen in the age group of 31-40 yrs. (37.5%) followed by 21-30 yrs. (25.9%). Males constituted (70.1%), females constituted about (29.8 %). Most common organ received was heart (31.8%), lung (30.6%) and liver (30.3%). Most common cause of death was sudden death 31(29.8%), myocardial infarction 21(20.1%), poisoning 20 (19.2%), assault 7 (6.7%), drowning 7 (6.7%), hanging 6(5.7%), road traffic accidents 5 (4.8%), firearm injuries 4 (3.8%) and electrocution 3 (2.8%). The lungs constituted 44.1% of all the histopathological findings, heart (20.5%), liver (10.2 %) kidney (7.3 %), spleen (5.8%), brain (4.4%), skin and neck structures (4.4%) and uterus (2.9%).

CONCLUSIONS

Atherosclerosis has become quite frequent cause of sudden and unexplained death in younger age group. So, we need to educate this age group about healthy lifestyle and importance of prophylactic screening to those having risk factors for cardiovascular diseases.

KEY WORDS

Medicolegal Autopsy, Sudden Death, Atherosclerosis.

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DOI: 10.14260/jemds/2022/78

How to Cite This Article:
Sarngal S, Arora S, Sharma S, et al. To study the pattern of histopathological findings in cases of medicolegal autopsies. J Evolution Med Dent Sci 2022;11(03):406-409, DOI: 10.14260/jemds/2022/78

Submission 02-01-2022,
Peer Review 12-02-2022,
Acceptance 18-02-2022,
Published 21-02-2022.

BACKGROUND

The word "Autopsy" is derived from the ancient Greek word Autopsia, "which means to see oneself."[1,2] Autopsies are done for medical purpose to ascertain the cause of death or for medicolegal purpose to characterize the injuries and determine the exact cause of death under suspicious circumstances. It is an important procedure in ascertain the cause of sudden and unexplained death.[3] There are four main types of autopsies.

- Medico-legal autopsy.
- Clinical or pathological autopsies.
- Anatomic or academic autopsies.
- Virtual or medical imaging autopsies.

Autopsies may be broadly described into two types. Clinical autopsy is a type of autopsy which is done to ascertain the clinical diagnosis in a patient which has led to mortality and which could not be identified antemortem. This type of autopsy is usually conducted by a pathologist. This type of autopsy is sometimes also done when the diagnosis is known, for the purpose of enriching the knowledge about a disease process. Another type of autopsy is medicolegal autopsy. This type of autopsy is done to identify the cause of death and the circumstances under which a person has died. This type of autopsy is conducted by a forensic expert and here the aim is to assist the law enforcing agencies to establish the exact cause, time and circumstances under which the person has died. This type of autopsy is usually requested by the law enforcing agencies in cases of suspicious death and in cases where the foul play is suspected. A systematic review by Gallagher et al. have revealed that in about 25% of autopsies a major diagnostic error will be revealed. So, these diagnostic errors can be further decreased to greater extent by complementing the medicolegal autopsies with histopathological examination of autopsies specimen. Histopathological examination of tissue specimens involves detailed examination of tissues under microscope and to look for subtle changes in tissues, which may be easily missed in gross tissue examination. This type of examination is invaluable especially in aetiologies like cases of poisoning and sudden unexplained deaths, where sometimes gross examination may be inconclusive. The other important thing which is many times overlooked is the specimen collection for histopathological examination. Poor technique of sample collection may render the whole exercise as fruitless. The common mistakes are like autolysis of the sample, collection of non-representative sample of pathology and sampling of necrotic tissue. Many incidental findings may be encountered while performing medicolegal autopsies. Some of these findings may be related to the cause of death and many may be just coincidental. Similarly, many coincidental findings may be encountered while doing histopathological examination of the specimens obtained from the medicolegal autopsies. While some of the findings may help us to establish the exact cause of death when corelated with the alleged history, the other coincidental findings may provide us an opportunity to study the natural course of evolution of many diseases which may not be possible in live patients.[4] Histopathological diagnosis of autopsy specimen with study of demographic characteristics also prove useful to account for many clinically undiagnosed diseases in the community like clinically undiagnosed neoplasms, infections and inflammatory diseases.[5] Thus it also helps us to do better public health planning.[6]

METHODS

The study was conducted in the Department of Pathology, Government medical college, Jammu, from April 2021 to June 2021. The sample size included all the specimen received in the department over the period of three months. This descriptive, prospective and non-interventional study was conducted on three hundred and twenty specimens received in pathology department for histopathological examination from one hundred and four cases of medicolegal autopsies irrespective of cause of death. Prior to histopathological examination all the demographic data from the records including alleged cause of the death was recorded.

Gross examination was done to note any evidence of autolysis, if present the sample was excluded from study. The other parameters like weight, consistency was recorded. The representative bits of the specimen were taken and processed and then stained with haematoxylin and eosin stain. (H & E stain).

Statistical Analysis

Descriptive statistics and MS Excel software was used.

RESULTS

The age wise distribution of cases is given in Table 1.

Age (yrs)	No. of Cases
0-10	1
11-20	4
21-30	27
31-40	39
41-50	21
51-60	8
61-70	4
Total	104

Table 1. Pattern of Age Distribution

Age (yrs)	Sex	
	Male	Female
0-10	1	0
11-20	3	1
21-30	21	6
31-40	27	12
41-50	14	7
51-60	4	4
61-70	3	1
Total	73	31

Table 2. Pattern of Sex Distribution

Maximum patients were seen in age group of 31-40 yrs. i.e., 39 (37.5%) followed by 21-30 yrs. i.e., 27 cases. (25.9%). On sex wise distribution it was found that majority of patients were males (70.1%). Females constituted about 29.8 % of the total patients. Table 2.

When the cases were analysed according to the nature of organs received, it was found that most common organ received were heart (31.8%), lung (30.6%) and liver (30.3%). Table 3.

Sl. No.	Organs Received	No.	Percentage
1	Heart	102	31.8%
2	Spleen	4	1.25%
3	Lung	98	30.6%
4	Kidney	6	1.8%
5	Liver	97	30.3%
6	Brain	5	1.5%
7	Uterus	4	1.25%
8	Skin and neck structure	4	1.25%
	Total	**320**	

Table 3. Distribution Based on Organ Received

When the cases were analysed for causes of death it was found that most common cause of death was sudden death 31 (29.8%). Other causes were myocardial infarction 21 (20.1%), poisoning 20(19.2%), assault 7 (6.7%), drowning 7 (6.7%), hanging 6 (5.7%), road traffic accidents 5 (4.8%), firearm injuries 4 (3.8%) and electrocution 3 (2.8%).

Sl. No.	Cause of Death	No. of Cases
1	Sudden death	31
2	Firearm injury	4
3	Hanging	6
4	Poisoning	20
5	Road traffic accident	5
6	Assault	7
7	Myocardial infarction	21
8	Electrocution	3
9	Drowning	7
	Total	**104**

Table 4. Case Distribution Based on Cause of Death

Sl. No.	Specimen Received	Histopathological Findings	No. of Organs with Significant Findings	%
1	Heart	Atherosclerosis (coronary plaques)	14	20.5%
2	Spleen	Congestion	4	5.8%
3	Lung	Pulmonary oedema	12	44.1%
		Diffuse alveolar damage	9	
		Pneumonia	3	
		Tuberculosis	3	
		Congestion	3	
4	Kidney	Congestion	2	7.3%
		Tubular necrosis	3	
5	Liver	Fatty change	5	10.2%
		Congestion	2	
6	Brain	SAH	1	4.4%
		Oedema and congestion	2	
7	Uterus	Myometrial hypertrophy	2	2.9%
8	Skin and neck structures	Haemorrhage and congestion	3	4.4%
			68	100%

Table 5. Distribution of Organs Based on Histopathological Findings

When the data was analysed for the histopathological findings, it was found that among all the organs significant histopathological findings were seen in 68 organs only i.e., 21.2% of the organs received. The findings in the lungs constituted 44.1% of all the histopathological findings amongst the organs followed by heart which constituted 20.5%, liver 10.2 %, kidney 7.3 %, spleen 5.8%, brain 4.4%, skin and neck structures 4.4% and uterus 2.9%. In lungs the most common histopathological finding encountered was pulmonary oedema (17.6%) followed by diffuse alveolar damage. In other organs like spleen the most common histopathological finding was congestion which was seen in 5.8% cases. In kidneys the most common finding encountered was tubular necrosis followed by congestion in kidneys. Fatty changes and the congestion were the most common findings in liver. In brain the most common finding encountered was oedema followed by sub arachnoid haemorrhage.

DISCUSSION

The recent advances in diagnostic medical technology have made the non-invasive diagnostic modalities more popular than the invasive techniques. The medicolegal autopsies still remain the examination of choice despite these technological advances, since it provides the direct access to the organs for physical examination. Many of these physical findings supplemented with histopathological examination are invaluable in determining the cause of death, which otherwise may not be feasible solely on the basis of simple non-invasive techniques. Histopathological examination of post mortem specimen often reveals many associated natural diseases. These causes when associated with trauma, crime may sometimes may contribute to cause of death especially sudden death.

The results of our study showed that maximum number of cases were seen in the age group of 31-40 yrs. and in males. In the study conducted by Renuka et al.[7] also the maximum patient were males. i.e., 68.4%. In study done by chandrakala[7] et al. 85.2% of patients were males. So, these findings are consistent with our study. The most common cause of death as reported by alleged history was sudden death i.e., 29.8%. Various studies in recent past have reported the increasing trend of cardiovascular diseases both among men and women in India. Many a times gross physical examination of heart specimen may not establish the exact cause of death and histopathological examination is an invaluable tool to establish the exact cause of death.

In our study myocardial infarction constituted about 20.1% as the cause of death. These finding corroborates with the study conducted by SAK Adil et al.[8] In their study the myocardial infarction constituted about 20% of cases. The most common organ received for histopathological examination was heart. This finding of our study also corroborates with the study by SAK Adil et al. In their study also the most common organ received for histopathological examination was heart 29.2%. This finding may be due to the fact that most of the cases in our study had alleged history of sudden death. The most common organ where the significant histological findings were found was lungs. The most common finding noted among all the organs was atherosclerosis (20.6%). In a study by Renuka et al.[7] also the most common histopathological finding was atherosclerosis (57.8%). In the study done by Adil et al. also the most common histopathological finding encountered was atherosclerosis. The liver is one of the most metabolically active organs in human body and is vulnerable to metabolic, toxic, microbial and circulatory insults. So, it becomes imperative to send liver specimen for histopathological examination especially in cases of suspected poisoning where other gross examination findings may not prove to be helpful in establishing the exact cause of death. In our study the fatty liver changes and the congestion of liver was the most common finding encountered.

This finding of our study is in accordance with the study done by SAK Adil et al.[8] and P et al.[9] In their study also fatty changes and congestion was the most common findings encountered in liver. In another study done by Minal and Rupali et al.[10] they showed congestion in 35.55% and fatty changes in liver in 24% of the cases. In a study by MS Bal et

al.[11] also the commonest finding was fatty change in liver followed by congestion. In a study by Algarsamy J et al.[12] fatty change, chronic venous congestion, cirrhosis and hepatitis were the predominant findings. In our study after liver the kidney was the organ where significant findings were encountered. The most common finding in kidneys were the congestion and tubular necrosis.

This finding of our study is in accordance with the study done by Khiste et al.[13] In their study tubular necrosis was seen in 33% of cases. In spleen the most common finding was congestion. In brain the the most common finding encountered was sub arachnoid haemorrhage, oedema and congestion. This finding is also in accordance with the study by Minal and Rupali et al. In study conducted by T Mukherjee et al.[14] also the commonest finding was brain oedema and haemorrhage. In cases of hanging and strangulation the commonest finding in our study was haemorrhage and congestion. In a study done by Navneet et al.[15] in cases of asphyxia death also the most common finding in neck and skin was haemorrhage, congestion and necrosis of tissues.

CONCLUSIONS

The study highlights the common histopathological changes encountered in medicolegal autopsies. The most common and significant finding in our study was atherosclerosis. This suggest that cardiovascular complications are becoming quite frequent cause of death, that too in our younger population. So, the health care professional need to focus their planning in this age group also. So, these group of patients need to be educated about their lifestyle management and emphasis should be laid on prophylactic screening in younger age group, more so those having risk factors for cardiovascular diseases. Small sample size was the limitation of our study.

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